REPORT

Racial Gaps in Early Childhood

Socio-emotional Health, Developmental, and Educational Outcomes Among African-American Boys

Yumiko Aratani | Vanessa R. Wight | Janice L. Cooper

April 2011

National Center for Children in Pov

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Introduction

The aims of this study are to examine racial gaps in cognitive and socio-emotional development among boys in early childhood and to identify factors that contribute to early resilience among African-American boys. Our main research questions include:

- What racial gaps emerge across cognitive and socio-emotional development in early childhood among African-American infant, toddler, preschooler, and kindergarten boys and white-American boys?
- Do these gaps remain after controlling for family socio-economic status (SES) and other child, family, and home environment characteristics?
- What factors contribute to early resilience and buffer against these risks among African-American boys?

A wealth of literature documents racial gaps and poor outcomes of school-age African-American children across a range of domains, including educational achievement measured by indicators such as test scores and rates of school exclusion.[1] African-American children and youth are two-to-three times more likely to be suspended from schools.[2] In particular, African-American boys perform poorly compared with white boys or African-American girls in different educational outcomes. Data from 2003 to 2009 indicate that by fourth grade, African-American boys in public schools score about 30 points lower in reading than white boys, and this gap remains at eighth grade. Research also shows a similar trend in mathematic achievement. At fourth grade, African-American boys score about 30 points lower than white boys and the gap increases to close to 40 points by eighth grade.[3]

African-American boys also lag behind their female counterparts.[4] While girls in general perform better in K-12 and in higher education than boys, gender differences among African-American groups are larger than among other groups. African-American women account for 62 percent of all African-American undergraduates and two-thirds of those who earn an associate's degree.[5]

An increasing number of research studies emphasize the importance of early childhood in determining one's adult socio-economic outcomes.[6] Early childhood development can have a long-term impact on later school achievement.[7] Yet, less information is available on the early emergence of gaps across a range of cognitive and socio-emotional outcomes.

For optimal personal and collective development of children and adolescents, five developmental domain factors are considered important: identity, emotion, social, cognition, and physical health.[8] While early childhood is a critical stage,[9] research rarely compares the racial gap across different outcomes during early childhood stages from nine months to kindergarten. Specifically, at nine and 24 months African-American boys score lower on cognitive assessments, manifest poorer health outcomes, and exhibit less secure attachments.[10] The factors that contribute to these early gaps or that are protective against poor outcomes are less clearly understood. Thus, it is important to identify when and how racial disparities among African-American and white boys emerge in early childhood and to examine factors that can contribute to early resilience.

Theoretical Models for Understanding the Racial Gap

Three main perspectives are used to understand racial gaps in test scores. The first perspective claims that racial differences in intelligence scores are genetic.[11] This claim has not received empirical support.[12] The second perspective argues that racial differences in family background largely contribute to the gaps in test scores. Research in this area has found that family socioeconomic status (SES), such as family income and assets, accounts for racial gaps in achievement scores. However, even after controlling for family SES, there are unexplained differences in test scores between black and white children.[13] The third perspective emphasizes the home environment, including parenting practices, mother's perceived self-efficacy, mental health, and emotional support, as contributing to racial gaps in achievement outcomes.[14] The second and third perspectives are interrelated since low socio-economic status, including poverty, causes stress and negative effects on parents' mental health and parenting practices.[15] On the other hand, having more financial resources allows parents to invest in materials such as toys and books, as well as less tangible resources which benefit children's development, such as time and supervision.[16] [17]

While the socioeconomic attainment of African-Americans has improved greatly since the 1960s,[18] there has been considerable class differentiation among African-American communities, and African-American children living in poverty have remained extremely disadvantaged.[19] African-American young children are more likely to live in poverty than other racial/ethnic groups except American Indians. About 66 percent of African-American young children are living in low income families and 41 percent are poor.[20] The consequences of this disadvantage are profound, as early childhood poverty can result in poor outcomes in adulthood.[21]

Resilience Among African-American Boys in Early Childhood

A large body of research documents risk and resilience in early childhood.[22] However, research on resilience among children from diverse racial, ethnic and language backgrounds has not been widely examined.[23] And what we do know has focused on negative outcomes rather than processes that might promote positive development.[24] In addition, very few studies have looked at resilience among young children.

Research in this area has defined resilience as functional competence or optimal development in the midst of exposure to hazards, threats, or adversities of any kind.[25] How resilience is measured in the literature varies.[26] However, work in this area generally suggests that resilience is characterized as the positive end of the distribution on developmental outcomes amidst high risk or when individuals exposed to risk exhibit better-than-expected outcomes.[27] Thus, identifying resilience requires information on both the exposure to adversity and about how well the individual is functioning in life.[28] Resilience, in short, does not occur in the absence of adversity. [29]

Two main models are generally used to examine resilience. The first is the compensatory model, which argues that protective factors counter the impact of negative events on children's lives.[30] In other words, the presence of something good is expected to counterbalance the influence of something bad, and these factors can be combined additively to influence children's outcomes. The second model also assumes a linear relationship between negative and positive life events. However, according to this model, risks and protective factors do not exert the same influence over children's development. Protective factors are assumed to be more important so that exposure to multiple risks has less effect on children's healthy development when children have a significant number of protective factors.[31] Both models have been empirically examined and received support, lending credence to the idea that there is a set of resources from which children can benefit that are related to healthy child development, even in the midst of adversity.[32]

The protective factors that have been found to facilitate resilience are typically grouped into three categories: 1) individual child factors, 2) family factors, and 3) social support.[33] Individual child factors include sociability, such as temperament and intellectual capability/cognitive development as well as racial identity. Family factors range from socio-demographic characteristics, such as educational attainment, family structure, income and employment status and neighborhoods, to factors related to family environment, such as maternal warmth and responsiveness, supervision, and the absence of neglect. The third set of protective factors involves social support and external resources, such as school and community relations and the presence of social networks.

For the purposes of this report, resilience is conceptualized broadly to include all African-American boys. That is, given that African-American boys, relative to their white peers, are more likely to be exposed to a range of risk factors, such as poverty, and that they also tend to have poorer outcomes when compared to both white boys and black girls, our analyses are not limited to any one particularly risk-exposed population (such as neglected children). In addition, we focus on a select set of protective factors that have been shown in the literature to be associated with positive outcomes in early childhood.

Thus, following these frameworks, we first examine how much of the racial gap remains across a range of developmental outcomes in early childhood after controlling for key family and child characteristics. Second, we investigate how key protective factors including maternal mental health, maternal warmth, having a checking or savings account, providing educational resources to children (such as toys), and family socioeconomic status (income and education) facilitates early resilience among African-American boys.

Description of Data and Methods Used in this Report

This study uses the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B) data, collected by the National Center for Education Statistics in the U.S. Department of Education. The ECLS-B is a nationally representative longitudinal study of approximately 11,000 children who were born in 2001. The children in the ECLS-B have been followed longitudinally and there are currently five waves of data available capturing children when they are 9 months old, 24 months old, 48 months old, and entering kindergarten (2006 and 2007 waves). The data provide information on children's overall development, health, care arrangements, and education from birth through kindergarten entry. The research presented here is based on all five waves of data. At baseline, there were 800 African-American boys and 2,200 white boys. For analyses examining the racial gap in cognitive and socio-emotional development, the sample includes both African-American and white boys. For analyses assessing early resilience, the sample is limited to African-American boys. Analyses at each wave are limited to children with complete information on all of the developmental outcomes and indicators of interest. We use the person-level weights constructed for the ECLS-B at each wave to produce nationally representative estimates.

Ordinary least squares (OLS) regression is used to estimate the racial gap in cognitive and socio-emotional development across the different stages of early childhood. Logistic regression is used to examine the relationship between a number of protective factors and early cognitive and socio-emotional resilience. All findings discussed in this report are significant at the .05 level, unless otherwise noted. Additional indictors of statistical significance are: + $p<0.10$ * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

For a more detailed discussion on data and methodology, please see Appendix A.

Table 1. **Characteristics of African-American Boys in ECLS-B Sample**

	All (N=3,000)		African-American Boys (N=800)		White Boys (N=2,200)	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Child and Family Characteristics at 9 months						
African-American	0.20	0.40	–	–	–	–
Child had low birth-weight	0.07	0.26	0.10	0.30	0.06	0.24
Child age (in months)	10.47	1.95	10.43	1.89	10.48	1.96
Mother has less than HSD	0.13	0.34	0.37	0.48	0.09	0.29
Mother – high school graduate	0.28	0.45	0.37	0.48	0.26	0.44
Mother – some college or more	0.59	0.49	0.37	0.48	0.65	0.48
Having two parents	0.80	0.40	0.42	0.49	0.90	0.30
Received WIC	0.43	0.50	0.80	0.40	0.34	0.47
Mother is teenage	0.11	0.31	0.19	0.39	0.08	0.28
Family income	7.85	3.42	5.14	3.31	8.54	3.08
Having checking/saving account	0.80	0.40	0.57	0.50	0.86	0.35
Provide toys to children	0.85	0.36	0.69	0.46	0.89	0.31
Parental warmth	35.11	4.50	33.59	4.34	35.47	4.46
Mother is not depressed	0.64	0.48	0.48	0.50	0.68	0.47
Child's Outcomes at 9 Months						
Cognitive development	76.47	9.78	75.72	10.11	76.66	9.69
Motor development	55.88	9.29	57.26	9.19	55.53	9.28
Socio-emotional development	24.32	3.75	23.81	3.91	24.46	3.69
Child's Outcomes at 24 Months						
Cognitive development	126.93	10.67	122.80	10.25	127.94	10.53
Motor development	81.25	4.95	81.85	5.22	81.10	4.87
Socio-emotional development	8.98	2.10	8.32	1.98	9.13	2.10
Child's Outcomes at Preschool						
Reading skills	25.50	9.92	21.76	8.64	26.36	9.99
Mathematic skills	29.79	9.72	25.69	8.84	30.73	9.67
Language development	2.39	1.02	2.21	0.92	2.44	1.04
Socio-emotional development	8.58	1.52	7.89	1.53	8.73	1.48
Child's Outcomes at Kindergarten						
Reading skills	38.53	15.11	34.26	13.69	39.79	15.28
Mathematic skills	40.94	10.88	36.08	10.48	42.38	10.58
Language development	3.42	0.79	3.25	0.79	3.47	0.79
Socio-emotional development	31.29	3.97	30.78	4.40	31.44	3.82

Results

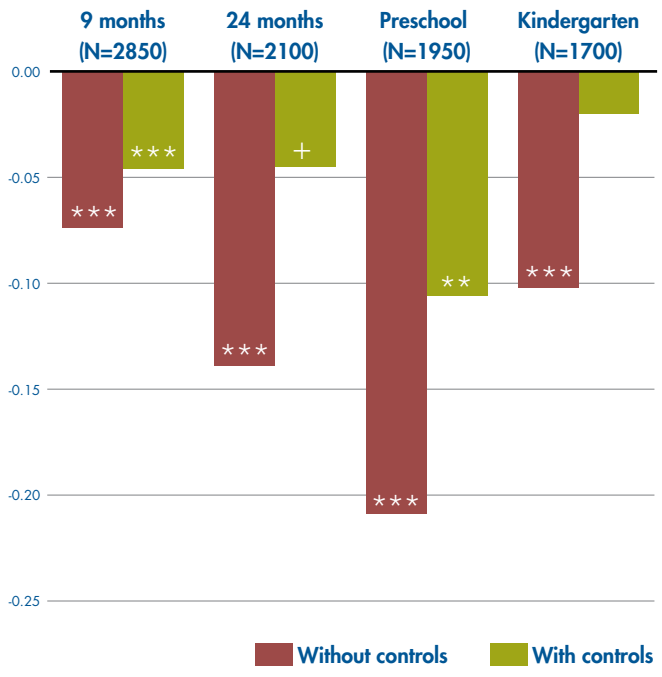
Table 1 shows overall descriptive characteristics by race, observed at baseline when boys were 9 months old. Twenty percent of the sample is African-American. In terms of child characteristics, about seven percent of all boys had low birthweight. A slightly higher proportion of African-American boys had low birthweight (10 percent) compared with six percent of white boys. As shown, African-American boys have many socio-economic disadvantages compared with their white counterparts. For example, close to two-thirds of white boys have a mother whose education is some college or more (65 percent) compared with less than half of African-American boys (37 percent). The overwhelming majority of white boys were living with two parents (90 percent) at 9 months. In contrast, only 42 percent of African-American boys resided in a two-parent family at baseline. Further, the majority of African-American boys live in households that receive WIC[35] (80 percent), compared with 34 percent of white boys. While the data are not shown, on average, household income among African-American boys ranges from $20,000 to 30,000, compared with $40,000 to 50,000 among white boys. In terms of having additional resources, only slightly over half of African-American families said they have a checking and/or savings account, while the majority of white families had an account (86 percent).

Main Findings: Racial Gaps in Early Childhood Outcomes Among Boys[36]

Socio-emotional Development

- African-American boys have significantly lower scores on socio-emotional development[37] starting from 9 months to pre-school age and this gap remains significant even after controlling for SES and demographic characteristics (see Figure 1). However, among kindergarten boys, the racial gap gets smaller than the gaps observed among 24 months and pre-school boys. Once we account for SES and demographic characteristics, the gap was no longer significant at kindergarten.

Figure 1: **Racial Gaps in Socio-Emotional Development by Age**



Note: Statistical significance are: + p<0.10 * p < 0.05, ** p < 0.01, *** p < 0.001. With controls are adjusted for child's age, mother's education, two-parent households, WIC receipt, teen mother, child low birthweight, family income, having checking/saving accounts, and parents providing toys to children.

Cognitive Development

- African-American infant boys are not signficantly different in cognitive development[38] from their white counterparts (see Figure 2). Once we control for SES and other key family characteristics, African-American infant boys do slightly better on cognitive development, although it is not statistically significant.[39] However by 24 months, significant racial gaps emerge in cognitive development among boys, although the gap is extremely small (about -0.07 of a standard deviation) after accounting for racial differences in socio-economic and other key demographic characteristics.[40]

Reading Scores

- African-American boys score relatively lower (from about one-tenth to one-fifth of a standard deviation) in reading skills assessments (see Figure 3).[41] However, once we control for SES, financial resources and demographic characteristics, the gaps disappear at pre-school age and at kindergarten, in fact, we see a better significant outcome for African-American boys than white boys.

Mathematics Scores

- African-American preschool and kindergarten boys score relatively lower (about one-fifth of a standard deviation) in math assessments (see Figure 4).[42] However, once we control for SES, financial resources and demographic characteristics, the gaps disappear.

Language assessment scores

- African-American preschool boys score relatively lower in language skills assessments[43] than white boys, and the gap is significant (see Figure 5). Among kindergarten age, this gap continues to be statistically significant and gets larger. However, once we control for SES, financial resources and demographic characteristics, the gas disappear.

In summary, we find that *racial disparities in socio-emotional development emerge at 9 months, and remain among toddlers and preschool-age boys*. After

Figure 2: **Racial Gaps in Cognitive Development**

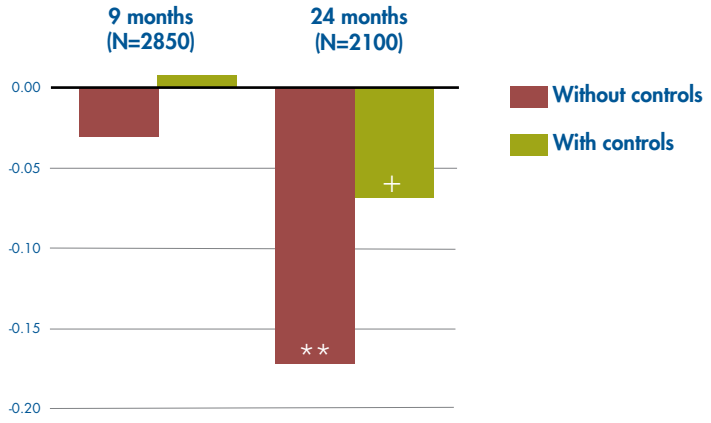


Figure 3: **Racial Gaps in Reading Scores**

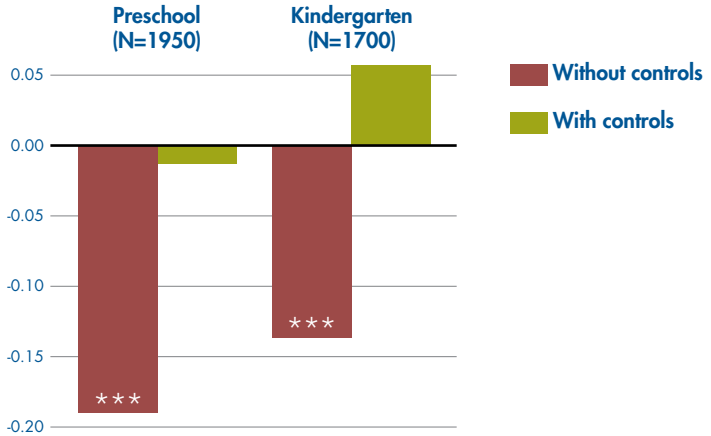
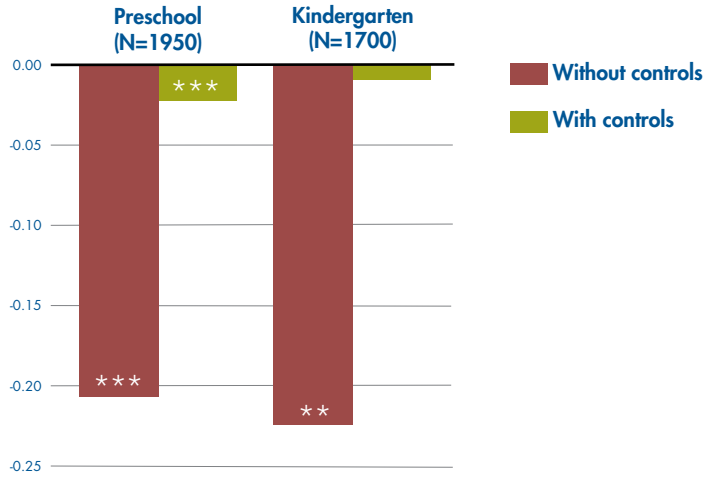


Figure 4: **Racial Gaps in Mathematics Scores**

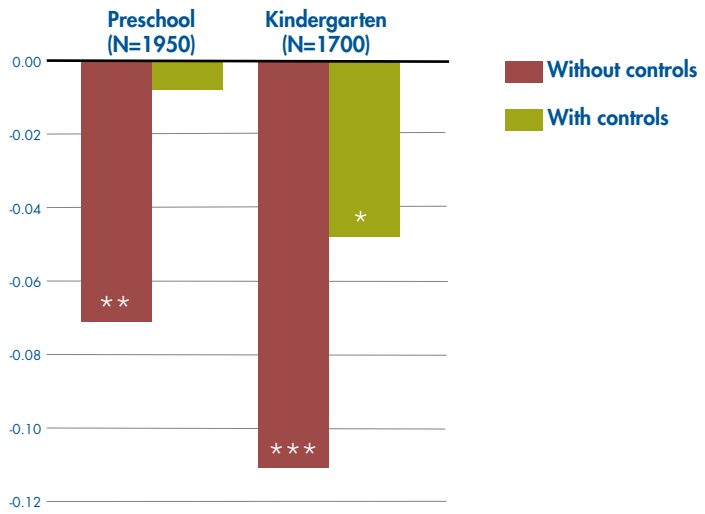


Note: Statistical significance are: + p<0.10 ; * p < 0.05, ** p < 0.01, *** p < 0.001. With controls are adjusted for child's age, mother's education, two-parent households, WIC receipt, teen mother, child low birthweight, family income, having checking/saving accounts, and parents providing toys to children.

controlling for SES and other key demographic and family characteristics, these disparities are no longer significant in kindergarten. The gaps in cognitive development also emerge at 24 months and are significant even after controlling for SES and other key demographic and family characteristics. On the other hand, racial disparities in math and reading scores found in preschool and kindergarten appear to be largely due to differences in SES and other key demographic characteristics such as not having low birthweight and not receiving public assistance (such as WIC) .

Given these findings, we examine the protective factors that facilitate positive development [44] among African-American boys in the areas where we find racial disparities: socio-emotional development at 9, 24, and 48 months, and cognitive development at 24 months.

Figure 5: **Racial Gaps in Language Skills**



Note: Statistical significance are: + p<0.10 ; * p < 0.05, ** p < 0.01, *** p < 0.001. With controls are adjusted for child's age, mother's education, two-parent households, WIC receipt, teen mother, child low birthweight, family income, having checking/saving accounts, and parents providing toys to children.

Main Findings: Early Resilience Among African-American Boys

Resilience in Socio-emotional Development

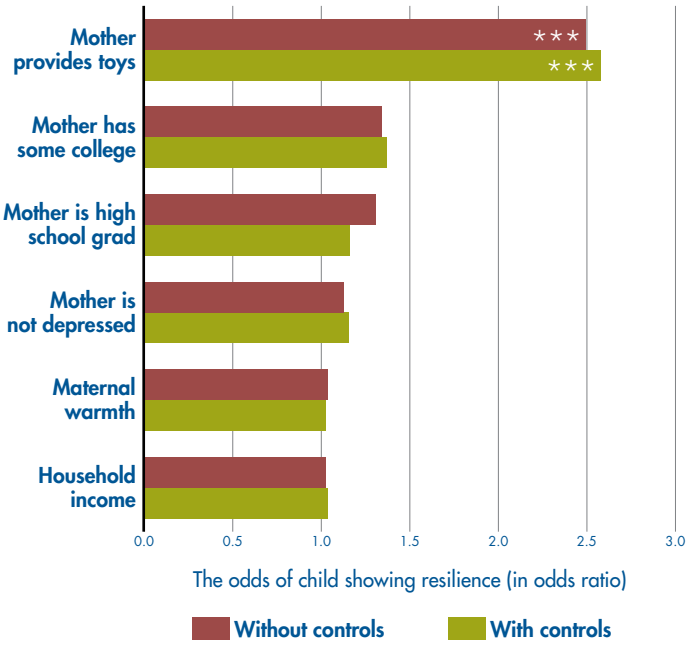
Infant Boys (9 Months)

- **Providing Toys Matters:** African-American infant boys benefit from early exposure to toys (see Figure 6). Infants with mothers who provided toys during the HOME assessment are more than twice as likely to exhibit above average socio-emotional development relative to infant boys with mothers who did not provide toys. This effect remains statistically significant after controlling for important child and family characteristics such as low birthweight, child age, family structure, and receipt of WIC.

Toddler Boys (24 Months)

We do not find evidence that the protective factors identified here are associated with African-American boys having above-average socio-emotional development at 24 months (data not shown). When we look at boys with exceptional pro-social behaviors at 24 months (scoring at the 75th percentile or above), our results indicate that maternal education is significantly

Figure 6: **Positive Factors that Promote Resilience in Socio-emotional Development at 9 Months Among African-American Boys (N=500)**



Note: Statistical significance are: + p<0.10 * p < 0.05, ** p < 0.01, *** p < 0.001. With controls adjusted for low birthweight, child age, teen mother, two parent household and WIC receipt (please see the details in Appendix B, table 1).

and positively associated with exceptional socio-emotional resilience(data not shown). However, research suggests the importance of racial socialization[45] on socio-emotional development and future research needs to explore or disentangle the impact of racial socialization on socio-emotional development.

- African-American male toddlers with mothers who have some college education are twice as likely as toddlers with mothers who have less than a high school diploma to score in the 75th percentile on pro-socioemotional development.

Preschool-age Boys (48 Months)

Maternal mental health and access to toys support social emotional development.(see Figure 7)

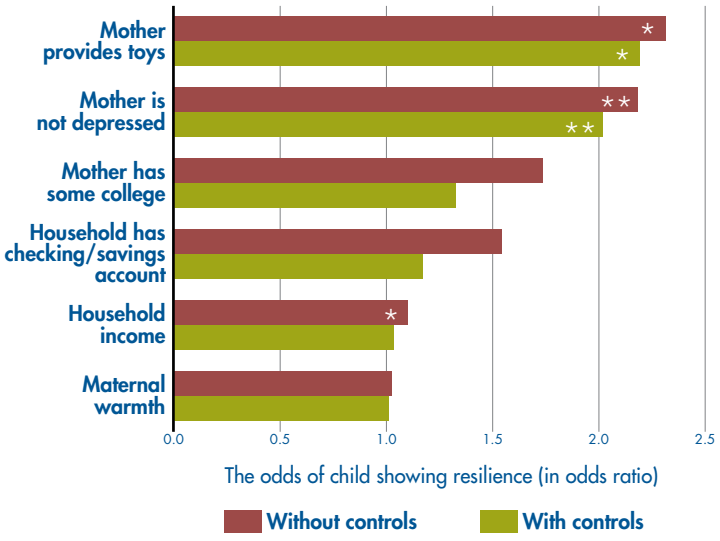
- Providing toys to African-American boys at 9 months (baseline) more than doubles the odds of being above-average on socio-emotional development in preschool.
- African-American preschool boys with mothers who are not depressed at baseline are two times more likely to exhibit above average socio-emotional development compared with their counterparts with depressed mothers at 9 months.
- There is also evidence that household income is positively associated with pro-socioemotional development in preschool, although this relationship does not hold once child and family characteristics at 9 months are controlled.

Resilience in Cognitive Development

Toddler Boys (24 Months)

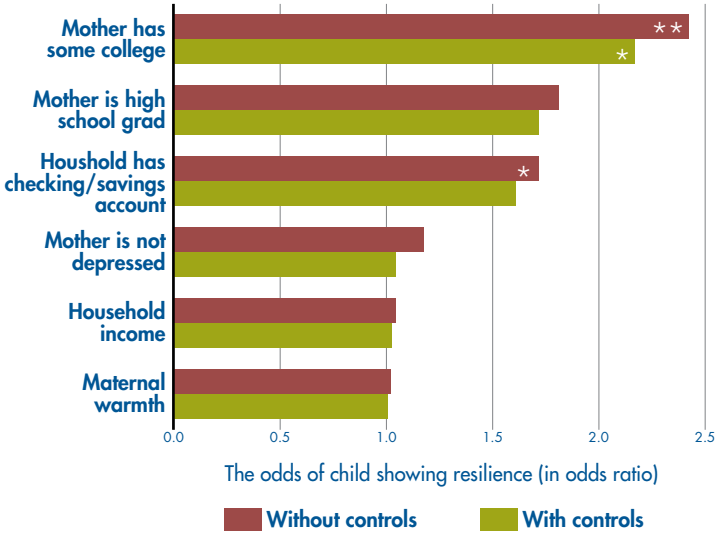
- **Maternal Education Matters:** African-American male toddlers with mothers who have at least some college are more likely to score above-average on cognitive development compared with those whose mothers have less than a high school diploma (see Figure 8). In short, the odds of scoring above average on the cognitive development assessment is 2.17 times greater for boys with mothers who have some college relative to mothers with less than a high school diploma.
- **Family Resources and Assets Matter:** Living in a household with a checking or savings account increases the odds of performing above-average on the cognitive development assessment, although this relationship disappears when child and family characteristics such as low birthweight, family structure and WIC receipt are taken into consideration.

Figure 7: **Positive Factors that Promote Resilience in Social-emotional Development at Preschool Among African-American Boys (N=400)**



Note: Statistical significance are: + p<0.10 * p < 0.05, ** p < 0.01, *** p < 0.001. With controls adjusted for low birthweight, child age, teen mother, two parent household and WIC receipt (please see the details in Appendix B, table 2).

Figure 8: **Positive Factors that Promote Resilience in Cognitive Development at 24 Months Among African-American Boys (N=400)**



Note: Statistical significance are: + p<0.10 * p < 0.05, ** p < 0.01, *** p < 0.001. With controls adjusted for low birthweight, child age, teen mother, two parent household and WIC receipt (please see the details in Appendix B, table 3).

Discussion

Our first question was "What racial gaps emerge across behavioral, developmental, and educational outcomes of boys in early childhood from infant, toddlers to preschool and kindergarten?" The second question was "do the gaps remain after controlling for family socio-economic status (SES) and other child, family, and home environment characteristics?"

Based on analyses of the gaps in early child development among African-American and white boys, we find evidence of racial gaps in socio-emotional development as early as 9 months. The gaps continue to grow until preschool-age in socio-emotional development. Further, even after controlling for key demographic and family characteristics such as family income, mother's education, family resources, (such as having a checking and/or savings account), and child's age and low birthweight status, we find that racial gaps in socio-emotional development remain in boys up to preschool.

Racial gaps in cognitive development emerge at 24 months and remain even after controlling for key demographic and family characteristics. Further, in reading and mathematics skills, we find significant differences between African-American and white preschool boys. The gap is still apparent in reading and mathematics by kindergarten and we also find evidence of differences in language skills by this age. However, the gaps in most of the school readiness outcomes disappear at pre-school and kindergarten, once we control for key demographic and family characteristics. Thus, racial differences in SES, financial resources, and child characteristics such as low birthweight may be contributing to the gap in educational outcomes.

We then asked what factors contribute to early resilience, meaning above average achievement in socio-emotional and cognitive development among African-American boys. Our results indicate that among African-American toddlers, maternal education contributes to above-average achievement, but only for cognitive development. That is, male toddlers with mothers who have at least some college are more likely to exhibit above-average cognitive development relative to male toddlers with mothers who do not have a high-school diploma. The protective factors identified here do not do much to explain above average development in pro-social behavior. However, we do find evidence that maternal education – specifically having at least some college – is an important factor predicting exceptional behavioral development (at the 75th percentile) among toddlers underscoring the important role of education in early resilience among African-American boys.

By preschool, maternal mental health and the provision of toys appear as significant protective factors associated with pro-socioemotional development. Having a mother with good mental health and providing toys early in childhood matter in a positive way for pro-social development among boys.

Limitations of this Study

One of the limitations of this study is missing data. For example, about six percent of the observations were missing data on providing toys, and about three percent of child outcome measures were missing due to non response at 9 months. Further, due to sample attrition from 24 months to kindergarten, between 15 to about 40 percent of child outcome measures had missing data. Thus, the findings of this study may have potential biases due to missing data. Secondly, compared with other national surveys such as the Panel Study of Income Dynamics (PSID) and National Longitudinal Survey of Youth (NLSY79) child data, the racial gaps found using ECLS-B are much smaller.[47] Thus, future research should test whether we find similar results using other national data sets. In addition, we are also limited to self reports in measuring maternal depression since we do not have a clinical measure of depression. Also the mechanism by which providing toys influences child development could be further examined.

Policy Recommendations

- **Early mental health prevention and intervention for African-American boys.** One of the key findings of this brief is that African-American boys are particularly vulnerable in socio-emotional development, and they appear to fall behind very early on in their life compared with white boys. Research has shown that socio-emotional competence is particularly important for early academic performance and young children who behave in anti-social ways are less likely to participate in the classroom and to be accepted by their classmates and teachers.[48] Thus, emotional, social and behavioral competence during early childhood is an important predictor of academic performance in elementary school, above and beyond cognitive skills and family background.[49] Children who can regulate their emotions well despite their disadvantaged background perform better in school.[50] It is important to provide effective prevention and early intervention programs to promote the socio-emotional well-being of young children.
- **Providing behavioral health/mental health programs for mothers with young children.** Research also shows that children who have a mother with depression are more likely to face socio-emotional health problems.[51] [52] The effect of parenting supports on child development for mothers with depression warrants additional attention.[53] Research shows that for mothers of young children there may be a positive association between a mother's mental health and her interaction with her child.[54] Thus, it is important to provide effective programs that are culturally competent and promote the mental health of mothers as well as socio-emotional development of young children.
- **Income enhancement and increasing financial resources are important but the method of providing such assistance may be a key.** Our research shows that providing toys is associated with early resilience and this supports the investment model, which suggests that children benefit from resources invested in them.[55] Research shows that income supplement programs can have a positive effect on children's mental health.[56] Thus, policies that increase the financial resources available for families to invest in children may be important for positive child development. The importance of income and assets for family economic security and child development is well-documented.[57] In addition to income supplement programs, asset-building programs such as Children's Saving Accounts and Individual Development Accounts (IDA) are important ways to increase financial resources among disadvantaged African-American families. Further, having financial assets is positively associated with reducing problem behaviors among young children.[58] On the other hand, research suggests that cash-assistance programs such as AFDC/TANF were associated with depression and substance use among women, although the causal relationship is less clear.[59] Thus, programs that promote economic self-sufficiency may better contribute to the optimal mental health of low-income mothers and socio-emotional development of children.

  We also find a positive effect of WIC on infant socio-emotional development. This may be due to the fact that WIC receipt incorporates training and parent education programs that can lead to better parenting practices, which result in better socio-emotional outcomes among African-American infants.
- **Increasing educational opportunities for mothers.** Mother's education plays a crucial role in child development and despite considerable progress achieved by African-American women, our data show that African-American mothers are much less likely to have college education than white mothers.[60] Overall, about 57 percent of African-American women have some college education compared with 72 percent of white women.[61] Research evaluating two-generation programs, which offer early childhood education programs to children while at the same time providing parents with both parenting and adult education (such as GED completion course, literacy education, or

job training) indicate some success that mothers in these two-generation programs are more likely to attain a GED that those who are not in those programs.[62] Thus, it is important to develop policies that further promote educational attainment of African-American women.

- **Providing educational resources to children.** As mentioned above, we find providing toys is associated with early resilience. Further, given that research finds the effect of income on cognitive ability is mediated by the home environment (which includes learning experiences in the home), interventions beyond increasing financial resources for families, such as those that focused on parenting practices, may also be beneficial to children's development.[63] According to several evaluation studies, there is some evidence that parenting and child intervention programs improve child development by influencing parenting behaviors, such as enhancing parenting skills to care for children in ways that promote positive child development.[64] Furthermore, some of the work in this area has found that the most successful parenting education programs involve home visits and hands-on parent education, such as learning-oriented programs that provide parents with instructions, materials, and role-playing exercises.[65]

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36. In each graph, the mean score for white boys is set as zero and each bar shows a difference between African-American and white boys (in a standard deviation). The base model (without controls) only includes race (being African-American) and the model with controls accounts for the following characteristics, which were all measured at baseline when the children were nine months old: child was born at a low birthweight, child age at assessment (reported in months), child had a teen mother, child lived with two parents, family income, mother's education, and parent received WIC in the last 12 months.

37. The Positive Behavior Index, which is a selection of items from the Behavior Rating Scale (BRS) of the BSID-II was used to assess children's socio-emotional development at 9 months. The index is based on interviewer observations of child behavior during the administration of the BSF-R. The seven items include displaying positive affect, displaying negative affect, relinquishing materials, showing interest in materials, paying attention to tasks, displaying social engagement, and showing control of movements. For each item, children were scored on a 5-point scale. The index was constructed by summing across the seven items to create a scale ranging from 7 to 35. The item on negative affect was reverse coded so that higher scores on the index indicate more positive behavior. Children's social behavior at 24 months and at preschool-age was measured using the Two Bags Children's Behavior Scales (e.g., joint book reading and pretend play with a set of dishes), which is

a modified version of the Three Bags Tasks used in the Early Head Start Research and Evaluation Project. It is a semi-structured task that asks the mother and the child to play for 10 minutes with different sets of toys from two bags. The sessions were videotaped and analyzed by trained researchers who coded the behavior of the parent and the child on global scales that range from 1 = very low to 7 = very high, which correspond to behavior domains known to be important to children's socio-emotional development (Nord et al., 2006). The videotaped data were coded on three global child behaviors (such as child engagement of mother, child quality of play, and child negativity toward mother). Scores on child engagement and quality of play were summed to construct a measure of children's socio-emotional behavior with higher scores indicating more positive development.

The measure of children's socio-emotional development at kindergarten captures children's approaches to learning and is based on items from the ECLS-K Social Rating Scale, the Social Skills Rating System (SSRS), the Family Child Experiences Study (FACES). The eight items included child shows eagerness to learn, child pays attention well, child works/plays independently, child keeps working until finished, child adjusts to new situations, child shows imagination, child accepts ideas, and child tries new things. For each item, children were scored on a 5-point scale ranging from 1 (never) to 5 (often). For children who were scored across all eight items, and overall score was constructed by summing across the eight items to create a scale ranging from 8 to 40. The Chronbach alpha was .78 suggesting that the items have relatively high internal consistency.

38. Cognitive development and 9- and 24-months is based on BSF-R mental scale. The BSF-R mental scale includes items designed to assess children's cognitive and language ability such as memory, means-end behavior, problem-solving, and vocalizations and gestures through standardized tasks (e.g. naming pictures, verbalizing, comparing sizes). The core set of items included 11 items at 9 months. The core set of items for the 2-year BSF-R mental scale has 19 items, including three language items scored by observation. The overall measure of the mental scale is designed to assess infants' and toddlers' cognitive development including memory, means-end behavior, exploratory competence, object permanence, expressive communication, and receptive communication. We use the IRT mental scale score, which are estimates of the number of items a child would have answered correctly had the full BSID-II been administered. Flanagan, K.; West, J. 2004. Children born in 2001: First Results from the Base Year of the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B) (NCES 2005-036). U.S. Department of Education, Washington, DC: National Center for Education Statistics.

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40. This measure is only available for 9 months and 24 months.

41. Early reading, math, and expressive language are used to measure children's cognitive development at preschool- and kindergarten-age. The assessment of preschool-age early reading contained 37 items representing the following content areas related to emergent literacy: 1) letter recognition, in both receptive and expressive modes; 2) letter sounds; 3) early reading and recognition of simple words; 4) phonological awareness; 5) knowledge of print conventions; and 6) matching word. The kindergarten assessment included items on the following content areas: 1) basic skills, such as letter recognition; 2) initial understanding, such a global understanding of what was read; 3) developing interpretations; 4) demonstrating a critical stance; and 5) vocabulary. Higher scores at both waves indicate more developed early reading skills.

42. Children's preschool- and kindergarten-age mathematics had three forms: a core, or routing test administered to all children, and alternative supplementary forms administered only for children in which all items were too hard or too easy. The preschool-age assessment included questions in the following content areas: 1) number sense; 2) geometry; 3) counting; 4) operations; and 5) patterns. The kindergarten-age assessment included questions on the following content areas: 1) number sense, properties, and operations; 2) measurement; 3) geometry and spatial sense; 4) data analysis, statistics, and probability; and 5) patterns, algebra, and functions. Higher scores on both measures indicate more developed math skills.

43. We use a measure of expressive language to assess children's language knowledge and skills. The preschool- and kindergarten-age expressive language score is based on the Let's Tell Stories subtest of PreLAS, in which children are asked to retell a story just read to them while referencing a set of pictures provided as prompts. Scores created by trained child assessment coders ranged from 0–5, where 0 indicates, "No response (includes "I don't know"), or no response in English" and 5 indicates "Articulate, detailed sentences, vivid vocabulary, and complex constructions," We use the average score across both stories with higher scores indicating more expressive language development.

44. This study focuses on six protective factors: maternal warmth, maternal mental health, household income, maternal education, providing toys, and assets.

Maternal warmth at 9-months is based on the Nursing Child Assessment Teaching Scale protocol (NCATS). In this task, mothers were asked to select and teach their infants a new activity from a list of age-appropriate activities (e.g., banging two blocks together, turning pages in a book). Higher scores indicate more positive parent-child interaction, such as parental sensitivity to the child's cues, responsiveness to child's distress, cognitive growth fostering, and socio-emotional growth fostering.

Mother's mental health is based on a modified version of the Center for Epidemiologic Studies–Depression Scale (CES-D). The 12 items included mother's self report of feeling bothered, having a poor appetite, feeling blue, having trouble keeping focused, feeling depressed, finding everything is an effort, feeling fearful, having trouble sleeping, talking less than usual, feeling lonely, feeling sad, having trouble getting going. For each item, the respondent scored herself on a 4-point scale indicating how frequently they experienced the time in the last week. We used the guidelines and cut points provided in the ECLS-B User's Manual for scoring the items to create a CES-D score. The score ranged from 0–36 with higher scored indicating increasing severity of depression. A dichotomous variable indicating the mother is not depressed is used in multivariate analyses. Mother's with a score ranging from 0 to 5 were coded as not depressed. All others were coded zero. Household income is based on the income reported in the previous year and is available in categories. Mother's educational attainment reported at baseline is used to construct three dichotomous variables: mother has less than a high-school diploma (reference group in regression analyses); mother has a high school diploma, but no additional education; mother has some college or more.

We used an item from the short form of the Home Observation for Measurement of the Environment (HOME) scale. Caldwell, B. M.; Bradley, R. H. 2001. HOME Inventory and Administration Manual. (3rd ed.). University of Arkansas for Medical Sciences and University of Arkansas at Little Rock. This variable indicates whether the respondent provided toys to the child. Children with mothers who provided toys during the HOME assessment were assigned 1; all other children were assigned 0.

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APPENDIX A: Data and Methods

Sample

This study uses data from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B), which is a nationally representative study of children born in the United States in 2001. The ECLS-B sample was designed to represent the nearly four million children born in the United States in 2001. The initial sample was selected using a clustered list frame approach and the sampling frame included registered births in the National Center for Health Statistics' vital statistics system. The primary sampling units (PSU) were counties or groups of counties. Children were sampled by occurrence of birth within these PSUs. The initial sample excluded children who had died or who had been adopted after the issuance of the birth certificate and infants whose birth mothers were younger than 15 years at the time of their child's birth. The children in the ECLS-B have been followed longitudinally and there are currently five waves of data available capturing children when they are 9 months old, 24 months old, 48 months old, and entering kindergarten (2006 and 2007 wave). The research presented here is based on all five waves of data.

The baseline survey consists of 10,688 infants. Nearly all children who participated in the ECLS-B lived with their biological mothers at 9 months and most lived with their biological fathers (78 percent).

Because the purposes of the reports in this series are to: 1) examine the race gap in children's motor, cognitive, and socio-emotional development across their early years and 2) examine the factors that can contribute to resilience among black boys in early childhood (between ages birth to 6), this report focuses on black and white children. The final analytical sample varies across waves, but is comprised of 3,000 children at baseline – 800 African-American and 2,200 white boys. Analyses at each developmental stage are limited to children who have complete information on the assessment data and covariates.

Method

For the research brief examining the race gap among African-American and white boys, we performed Ordinary Least Squares (OLS) regression. We assessed gaps in both cognitive and socio-emotional development outcomes across the four developmentally distinct stages: 9 months, 24 months, preschool-age (24 months), and kindergarten. For the research brief assessing early cognitive and socio-emotional resilience among African-American boys, we used logistic regression to examine the relationship between a number of protective factors and above-average achievement.

All analyses have been weighted using person-level weights constructed for the ECLS-B. The weights adjust for disproportionate sampling, survey nonresponse, and noncoverage of the target population. In the two reports, we use W1C0, W2C0, W3C0, and WK1C0 for the 9 month, 24 month, pre-school, and kindergarten analyses, respectively. These weights are acceptable for cross-sectional analyses of child assessment data in the ECLS-B.*

All findings discussed in this report are significant at the .05 level, unless otherwise noted. Additional indictors of statistical significance are: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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* National Center for Education Statistics. 2005. Early Childhood Longitudinal Study, Birth Cohort: 9-Month Public Use Data File User's Manual. Washington, DC: National Center for Education Statistics, U.S. Department of Education.

APPENDIX B: Complete Results for Analysis of Early Resilience (Above Average) Among African-American Boys

Table 1: **Odds Ratio Estimates for Resilience in Socio-emotional Development at 9 Months (N=500)**		
(Independent Variables)	Without controls	With controls
Mother provides toys	2.493 ***	2.577 ***
Mother has some college	1.34	1.369
Mother is high school graduate	1.306	1.161
Mother is not depressed	1.128	1.157
Maternal warmth	1.035	1.025
Household income	1.026	1.035

Table 2: **Odds Ratio Estimates for Resilience in Socio-Emotional Development at Preschool Among African-American Boys (N =400)**		
(Independent Variables)	Without controls	With controls
Mother provides toys	2.315 *	2.193 *
Mother is not depressed	2.180 **	2.018 **
Mother has some college	1.734	1.325
Household has checking/savings account	1.540	1.168
Household income	1.100 *	1.034
Maternal warmth	1.026	1.012

Table 3: **Odds Ratio Estimates for Resilience in Cognitive Development at 24 Months Among African-American Boys (N=400)**		
(Independent variables)	Without controls	With controls
Mother has some college	2.42 **	2.17 *
Mother is high school grad	1.809	1.717
Household has checking/savings account	1.718 *	1.61
Mother is not depressed	1.173	1.043
Household income	1.045	1.025
Maternal warmth	1.021	1.005

NOTE: With controls include low birthweight, child age, teen mother, two parent household and WIC receipt; statistical significance are:
+ $p<0.10$; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

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